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MOUNTAIN ARTILLERY.

Naval War College

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The Gift of
Brig. Gen. Lorenzo Thomas,
Adj. Gen. U. S.,
15 May, 1868.

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INSTRUCTION

FOR

MOUNTAIN ARTILLERY,

PREPARED BY A BOARD

OF

ARMY OFFICERS.

WASHINGTON:
GIDEON AND CO., PRINTERS.
1851.

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War 1408.51

1868 May 19:
Gift of
Lorenzo Thomas
Adjutant General
U. S.

WAR DEPARTMENT,
December 5, 1850.

The system of "Instruction for Mountain Artillery," prepared by a Board of Army Officers, pursuant to orders from the General-in-chief, having been approved by the PRESIDENT of the United States, it is hereby adopted, and published for the use of the Army; and, under the act of May 12, 1820, for the observance of the Militia of the United States.

C. M. CONRAD,
Secretary of War.

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NOTE.—This publication being regarded as an appendix to the system of instruction for Field Artillery in use in the Army, (with which, in future editions, it is to be incorporated,) its paragraphs and the plates are numbered in continuation of those in the work on Field Artillery, approved March 6, 1845.

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INSTRUCTION

FOR

MOUNTAIN ARTILLERY.

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INSTRUCTION

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MOUNTAIN ARTILLERY.

SCHOOL OF THE PIECE.

215. *Remarks.* The piece used for mountain service is the light 12pdr. Howitzer. It is generally transported by mules. The piece and the shafts may be packed upon one mule, the carriage upon another, and the ammunition chests upon a third. The carriage is adapted for draught. (Plates 70, 71, and 72.)

216. The mule that draws the piece, or carries it when packed, is called the *shaft mule;* the mule that carries the carriage, when packed, the *carriage mule;* and the mule on which the ammunition chests are packed, the *ammunition mule.*

217. *The piece is in battery* when the shafts are detached and it is in a proper position to be fired. The front in this case is the direction towards which the muzzle points. The front, when the shafts are attached, is the direction towards which the shafts point. The right of the piece, in both cases, is the right of the cannoneer when facing to the front.

The position of the mules, when the piece is in battery, is as follows:

The ammunition mule fifteen yards in rear of the piece, the shaft mule two yards in rear of the ammunition mule, and the carriage mule two yards in rear of the shaft mule, all facing towards the piece.

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218. *In the order of march, with the Howitzer mounted on its carriage*, the shaft mule is hitched in, and the carriage and ammunition mules follow; the first, two yards from the piece, and the second, two yards from the first.

219. *In the order of march, with the piece and carriage packed upon the mules*, the shaft mule leads, and the other two follow; the distance between each being two yards.

FORMING THE DETACHMENT.

220. Six men are required for the service of the piece. They are formed in two ranks, and told off from the right by the chief of piece; Nos. 1 and 2 being on the right, No. 3 and the gunner being in the centre, and Nos. 4 and 5 on their left; the even numbers and the gunner being in the front, and the odd numbers in the rear rank.

The detachment is marched to the piece, and posted as follows:

POSTS OF THE DETACHMENT.

221. *In battery.* Nos. 1 and 2 about one yard outside of the wheels, and in line with the axletree, No. 1 being on the right, and No. 2 on the left; the gunner at the end of the trail; No. 3 opposite to the knob of the cascable, covering No. 1; No. 4 on the right, and No. 5 on the left of the ammunition mule; all facing to the front. The chief of piece is opposite to the trail, outside of, and near the left cannoneers.

222. *In battery, without mules.* Nos. 4 and 5 are on the right and left of the ammunition chests, facing to the front.

223. *In the order of march, shaft mules hitched in.* Nos. 1 and 2 opposite to the muzzle; the gunner and No. 3 opposite to the trail; and Nos. 4 and 5 opposite to the saddle of the ammunition mule; the gunner and even numbers on the right, and the odd numbers on the left; all facing to the front, and covering each other in lines one

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yard from the wheels. The chief of piece is on the left of the driver of the shaft mule.

224. *In the order of march, mules packed.* Nos. 1 and 2 at the shaft mule; the gunner and No. 3 at the carriage mule; and Nos. 4 and 5 at the ammunition mule; the gunner and even numbers on the right, and the odd numbers on the left; all opposite to the saddles, one yard from the mules, and facing to the front. The chief of piece is on the left of the driver of the shaft mule.

225. There is one driver to each mule. He is on the left of the mule, and holds the reins with the right hand, six inches from the mouth, the hand high and firm.

SERVICE OF THE PIECE.

226. The piece is in battery, the men at their posts. (No. 221.)

The shafts are placed on the ground, one yard and a half from the line of the right wheel, and parallel to it, the cross-bar opposite to the trail, the shafts pointing to the rear.

The chests, when the ammunition mule is absent, are on the ground, fifteen yards in rear of the trail, their sides parallel to the axis of the piece, backs together, the turn-buckles outside.

227. At the command TAKE EQUIPMENTS, the gunner distributes the equipments. No. 1, with the assistance of No. 3, takes out the sponge. The gunner equips himself with the belt containing the hausse and priming wire, and with the knee-guard and the finger-stall, wearing the last on the second finger of the left hand. No. 3 wears the tube pouch containing friction tubes and the lanyard. Nos. 1 and 2 wear bricoles hung from the left shoulder to the right side. Nos. 2 and 5 wear havresacks hung from the right shoulder to the left side.

THE COMMANDS.

228. In loading by detail the instructor gives all the commands.

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The commands are: *Load by detail,* LOAD, 2, 3, 4; SPONGE, 2, 3, 4; RAM, 2, 3; READY; FIRE; and CEASE FIRING.

When the service of the piece is not executed by detail, the commands of the instructor are, either LOAD, COMMENCE FIRING, and CEASE FIRING; or, COMMENCE FIRING and CEASE FIRING. After the command COMMENCE FIRING, the action is continued without farther commands from the instructor until the command CEASE FIRING.

The last command is repeated by the chief of piece and the gunner.

DUTIES OF THE CANNONEERS.

229. *Duties of the gunner.* In action, the gunner gives, or repeats the commands of execution. At the command or signal to commence firing, he gives the word LOAD; plants the left foot opposite to the knob of the cascable; places the right knee upon the ground near, and on the left of the trail; places the hausse, when it is used; seizes the lunette with the right hand, to give the direction, and at the same time tends vent with the second finger of the left hand, the thumb on the base of the breech.

As soon as the piece is loaded and aimed, he removes the hausse; then rising, pricks the cartridge; gives the word READY, and stepping clear of the wheel to the side whence he can best observe the effect of the shot, gives the command FIRE. He continues the action in the same manner, without farther commands from the instructor, until the firing is ordered to cease.

When the instructor, instead of giving the command COMMENCE FIRING, gives that of LOAD, the gunner repeats it, and performs the same duties as just described, except that he does not command FIRE, until the firing is ordered to commence.

When the instructor gives all the commands, the gunner performs the same duties, but without repeating the commands.

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230. *Duties of No.* 1. Until the command LOAD, he stands square to the front, in line with the axletree, holding the sponge staff about the middle in the right hand, and trailing it at an angle of 45°.

For the convenience of instruction, the duties of No. 1 are divided into motions.

First motion. At the command LOAD, No. 1 faces to his left, steps obliquely to his right with the right foot, and brings the sponge into a perpendicular position over the right toe, the elbows close to the side, the right hand at the height of the elbow.

Second motion. He plants the left foot near, and in line with the wheel, and inclines the sponge across the body to the left, the right hand opposite to the middle of the body.

Third motion. He places the right foot twelve inches to the right of the left, heels on the same line; brings the sponge into a horizontal position, and extending the hands towards the ends of the staff, back of the right hand up, that of the left down, rests the sponge-head against the face of the piece; the knees straight, the feet turned out equally, and the body inclined forward.

Fourth motion. He introduces the sponge, drops the left hand by the side of his thigh, and shoves the sponge to the bottom of the chamber.

231. At the command SPONGE, he carefully sponges out the chamber.

Second motion. He draws out the sponge, pressing it upon the bottom of the bore, seizes the staff near the sponge-head with the left hand, back down, and rests it against the face of the piece.

Third motion. He turns the sponge over by bringing the hands together at the middle of the staff, and giving it a cant with each, throws the sponge over, at the same time turning the wrists so as to bring the staff horizontal. He then extends the hands towards the ends of the staff, back of the left up, that of the right down.

Fourth motion. As soon as the charge is inserted he

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introduces the rammer-head into the muzzle, and joins the left hand to the right.

232. At the command RAM, he sets the charge carefully home, throwing the left hand over the piece.

Second motion. He throws out the sponge with the right hand, letting it slide through the hand as far as the middle of the staff, when he grasps it firmly, and seizing it close to the rammer-head with the left hand, back up, rests it against the face of the piece.

Third motion. He raises the sponge to the height of his breast, and steps back, right foot first, to his position opposite to the axletree; quits the staff with the left hand, and throwing the sponge uppermost, holds it at a trail in the right. He remains facing the piece until the command LOAD, when he steps up and performs the duties just described.

When the loading is not by detail, No. 1 goes through all his duties at the command LOAD.

At the flash of the gun, or command LOAD, he steps up and again performs his duties as before, and so on, until the command CEASE FIRING is given. At this command he resumes his post, faces to the front, first sponging out the piece if it has been commenced.

233. *Duties of Nos. 2 and 5.* Until the command LOAD, Nos. 2 and 5 stand square to the front, the former in line with the axletree, the latter on the left of the ammunition mule, or chests.

At this command, No. 2 faces about, and goes to the ammunition chest; and No. 5, having received a round of ammunition from No. 4, carries it to the piece, placing himself opposite to No. 1, and in line with the wheel, inserts the charge as soon as No. 1 has sponged, then steps back to the post of No. 2, opposite to the axletree, and there remains, facing the piece until it is fired, when he returns to the ammunition chest. No. 2, having received a round of ammunition, carries it to within five yards of the wheel, where he remains until the piece is fired; he then moves forward and executes the remainder of the service as just described for No. 5.

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Nos. 2 and 5 in moving to and from the piece, go at a run, and pass each other by the right.

In inserting the charge they should be careful to keep the seam down, and to place the fuze in the axis of the bore.

At the command CEASE FIRING, they resume their posts, facing to the front.

234. *Duties of No.* 3. No. 3 holds the handle of the lanyard in the right hand, the cord passing between the fingers, the hook between the forefinger and thumb. At the command LOAD, he takes a friction tube in the left hand, and passes the hook of the lanyard through the eye of the tube from right to left, continuing to hold the hook between the thumb and forefinger. At the word READY, he faces the piece, and steps up, keeping outside of the wheel; inserts the tube, steps back with the right foot, breaks to his rear a full pace with the left foot, and holds the lanyard slightly stretched, the handle at the height of the knee, back of the hand up, the left hand against the thigh. At the command FIRE, he gives a smart pull upon the lanyard, being careful to keep the hand low, and then resumes his post.

At the command CEASE FIRING, he winds the lanyard upon its handle, and if dry, puts it in the tube pouch.

235. *Duties of No.* 4. No. 4 attends at the ammunition chests, serves out ammunition, and prepares and inserts fuzes.

CHANGING POSTS.

236. In order to instruct the men in all the duties at the piece, the instructor causes them to change posts by the following commands :

1. *Change posts.*
2. MARCH.

At the first command, the cannoneers on the right of the piece face about, take off their equipments, and

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place them on the piece or ammunition chests. At the second command, all step off, each taking the post and equipments of the one in his front; No. 2 passing around the muzzle to gain the post of No. 1, and No. 4 around the ammunition chests to take that of No. 5.

237. During the intervals of rest the instructor will explain to the men the nomenclatures of the piece and carriage, and the names and uses of the implements and equipments.

SERVICE OF THE PIECE WITH DETACHMENTS OF DIFFERENT STRENGTHS.

238. *Two men.* The gunner commands, tends vent, points, pricks, primes, and fires. No. 1 sponges, serves ammunition, and loads.

Three men. The gunner commands, tends vent, points, pricks, primes, and fires. No. 1 sponges. No. 2 serves ammunition, and loads.

Four men. The gunner commands, tends vent, points, and pricks. No 1 sponges. No 2 serves ammunition, and loads. No. 3 primes, and fires.

Five men. No. 4 attends at the chests, and serves ammunition to No. 2, occasionally alternating with him. The other numbers serve as with four men.

Six men. No. 5 alternates habitually with No. 2. No. 4 remains at the chests. The other numbers serve as with four men.

THE LOCKING ROPE.

239. The locking rope is habitually coiled and suspended from the front arc of the saddle of the shaft mule. When it become necessary to use it in order to prevent the too great recoil of the piece, No. 2, on receiving orders to that effect, brings it up from the mule, and, with the assistance of No. 1, locks the wheels. No. 2 attaches one end of it by a timber hitch to the felly of the left wheel, near the ground, and No. 1 at-

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taches the other end in the same manner to the right wheel, the rope passing over the stock. The length of the rope should be regulated by the nature of the ground.

When in firing it becomes necessary to run the piece forward, the locking rope is detached; No. 2 carries it; and it is reattached as soon as the piece is in battery. When not in use it is placed on the ground, outside of, and near No. 2.

When the firing is to be discontinued, No. 2 returns it to its place on the saddle. The locking rope should not be used when it can be avoided; since on rough ground it is liable to break the wheels, and on soft ground to upset the carriage.

ATTACHING AND DETACHING THE SHAFTS.

240. To attach the shafts, the instructor commands:

ATTACH SHAFTS.

The gunner raises the trail; No. 3 springs in between the shafts, seizes them about twelve inches from the cross-bar, and places the supporting bar upon the trail; the gunner then puts in the key and lowers the trail to the ground. No. 1, with the assistance of No. 3, puts up the sponge; and the cannoneers about the piece assume their posts as in the order of march, shaft mule hitched in.

241. To detach the shafts, the instructor commands:

DETACH SHAFTS.

The gunner raises the trail, and unkeys the shafts; No. 3 springs in between them, seizes them about twelve inches from the cross-bar, (the gunner at the same time lowering the trail to the ground,) detaches, and places them as prescribed in No. 226.

No. 1, with the assistance of No. 3, takes out the sponge; and the cannoneers about the piece take their posts as in battery.

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MOVING THE PIECE BY MEANS OF THE CANNONEERS.

242. *The shafts detached.* The instructor commands:

1. *By hand to the front (or rear.)*
2. MARCH.

At the first command, Nos. 1 and 2, facing to the front (or rear,) apply themselves to the wheels with the hand nearest to the piece, the former carrying the sponge, and the latter the locking rope, in the hand farthest from the piece; the gunner raises the trail.

At the second command, all step off. At the command HALT, they resume their posts.

243. *When bricoles are to be used, the shafts attached.* The instructor commands:

1. *By bricoles to the front (or rear.)*
2. MARCH.

At the first command, Nos. 1 and 2 attach the hooks of their bricoles to the washerhooks, and hold the rope with the hand nearest to the piece; the gunner and No. 3 apply themselves to the shafts; all facing in the direction they are to move.

At the second command, all step off.

At the command HALT, they resume their posts; Nos. 1 and 2 unhooking their bricoles with the hand nearest to the piece.

244. *Without bricoles, the shafts attached.* The instructor commands:

1. *Forward.*
2. MARCH.

At the first command, the gunner and No. 3 apply themselves to the shafts; Nos. 1 and 2 at the wheels, as in No. 242.

At the second command, all step off. At the command HALT, they resume their posts.

When the movement requires it, Nos. 4 and 5 carry the ammunition chests to their new position.

No. 3 carries the shafts when they are detached.

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SERVICE OF SEVERAL PIECES.

245. Forming, and marching, the detachments to and from the pieces, are executed as in No. 42, field artillery.

POSTING, AND CHANGING THE POSITION OF, DETACHMENTS.

246. *To form the order of march, the detachments being in line, in front.* The instructor commands:

1. *Detachments to your posts.*
2. MARCH.

At the first command, the chiefs of pieces face the detachments to the right. At the second, the detachments, Nos. 1 and 2 opening out, file to their posts, each number halting at his place. The chiefs of pieces face them to the front by the command ABOUT FACE.

To form the order of march, the detachments being in line, in rear, the instructor gives the same commands.

At the first command, the chiefs of pieces face the detachments to the left; at the second, the detachments march to their posts; each number halting as before.

247. *From the order of march, to the front (or rear.)* The instructor commands:

1. *Detachments front (or rear.)*
2. MARCH.

To the front. At the second command, repeated by the chiefs of pieces, the detachments, No. 3 and the gunner closing to the centre when clear of the mule, march to the front, file to the left, and are halted, and faced to the front by the chiefs of pieces.

To the rear. At the first command, the chiefs of pieces face the detachments about, Nos. 4 and 5 standing fast. At the second command, the detachments, Nos. 1 and 2 closing to the centre as they advance, march to the rear, file to the left, are halted and faced to the front by the chiefs of pieces. In both cases Nos. 4 and 5 take their places on the left, when the detachment is in the position ordered.

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HITCHING AND UNHITCHING.

248. *To the front.* The instructor commands:

HITCH TO THE FRONT.

At this command, the shafts are attached (No. 240,) and the gunner and No. 3 bring the piece about, each by means of the shaft on his own side.

The mule passing on the right of the piece, is led by its driver to the front and hitched in, the driver backing the mule and buckling the breast straps to the staples; the gunner and No. 3 buckling the thill straps around the shafts through the staples, and the breech straps to the staples.

249. *To the right (or left.)* The instructor commands:

HITCH TO THE RIGHT (OR LEFT.)

At this command, the shafts are attached, and turned in the proper direction, and the mule inclining to the right, or left, is led to its place, and hitched in as before.

250. *To the rear.* The instructor commands:

HITCH TO THE REAR.

At this command, the shafts are attached, the mule brought up, faced about, and hitched in as before.

251. In hitching in to the front, the carriage and ammunition mules, the former first passing the latter, are led up to their proper positions.

In hitching in to the right (or left,) the mules are, in like manner, led up and wheeled to the right, or left at the proper intervals.

In hitching in to the rear, the carriage and ammunition mules following the shaft mule in the order named, are led past the piece to their position in the rear.

For the position of the mules, see No. 217.

UNHITCHING AND COMING INTO ACTION.

252. *To the front.* The instructor commands:

ACTION FRONT.

At this command, the mule is unhitched; the driver unbuckling the breast straps, and the gunner and No. 3 the

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breech and thill straps. The driver then leads the mule to its place in rear, and the gunner and No. 3 supporting the shafts until the mule is taken out, bring the piece about. This done, the shafts are detached and placed as in No. 226.

The carriage and ammunition mules are led at once to their positions. (See No. 217.)

253. *To the right, left, or rear.* The instructor commands:

ACTION RIGHT, (LEFT, OR REAR.)

At this command, the mule is unhitched; the piece placed in the required direction; the shafts detached, and each mule led to its proper position.

In action rear, the carriage and ammunition mules pass by the right of the piece to their places in rear.

The mules face towards the piece as in action front.

PACKING AND UNPACKING.

254. *The mule unhitched, and shafts detached.* The instructor commands:

1. *Prepare to pack the piece.*
2. PACK THE PIECE.

At the first command, the driver leads the shaft mule three yards in rear of the piece, the crupper towards the trail; No. 1, after removing the right cap square, takes the sponge and inserts the rammer head to the bottom of the bore; and No. 2, after removing the left cap square, takes the handspike, and passing one end to No. 3, places it under the knob of the cascable, the loop around the neck. All face towards the mule and prepare to raise the piece.

At the second command, they raise the piece, No. 1 inclining slightly to his left to clear the wheel, and place it upon the saddle, the trunnions in their beds, the vent up, and the cascable towards the head of the mule. No. 1 then withdrawing the sponge, places it and the handspike which he receives from No. 2, upon the carriage, and goes to the shafts. No. 3, with the assist-

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ance of No. 2, secures the piece firmly to the saddle by means of the lashing rope.

For this purpose he passes one end of the rope (the other being fastened to the near hook of the lashing girth) over the piece to No. 2, who passes it back beneath the transoms, receives it again over the piece, and then fastens it, drawing the rope tightly to the off hook of the lashing girth. This done, No 1 turns the shafts round and carries them near the mule, and Nos. 2 and 3 seizing them near the cross bar, with the assistance of No. 1 acting at the ends, raise and place them upon the mule; resting the cross bar upon the cascable, and the shafts upon the arcs; Nos. 2 and 3, the latter first putting the key in its place, then secure the shafts firmly by means of the lashing straps.

PACKING THE CARRIAGE ON THE MULE.

255. The instructor commands :

1. *Prepare to pack the carriage.*
2. PACK THE CARRIAGE.

At the first command, the driver leads the carriage mule in front of the carriage, and three yards from it, the crupper towards the head of the carriage; the gunner, first replacing the cap squares, raises the head of the carriage, and Nos. 4 and 5 at the right and left wheels respectively, remove the linch pins and washers, take off the wheels, and lay them on the ground behind them, the larger end of the nave uppermost. This done, Nos. 4 and 5 replace the linch pins and washers, and seize the arms of the axletree; and the gunner, quitting the head of the carriage, seizes the trail; all face towards the mule, and prepare to raise the carriage.

At the second command, they raise the carriage and place it upon the saddle, between the transoms; the axletree just in front of the forward arc, the understraps upon the arc, and the nuts of the trunnion plate bolts just in rear of it. The carriage having been placed, No. 4, with the assistance of No. 5, secures it with the

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lashing cord, taking two turns with the cord round the stock and transoms, and then tying it. This done, they suspend the wheels by the fellies, from the arms of the axletree; the large end of the nave between the arcs, and resting against the leather of the outside bar, and secure them firmly by means of the lashing straps.

The whole is then strongly bound by the lashing rope. For this purpose, No. 5 having fastened one end to the near hook of the lashing girth, passes the rope up from the inside between the nearest convenient felly and spoke, and continues it on, pressing it in front of, and against the outside part of the nave, embracing one or more spokes, to the top felly, under which, and over the stock, he passes it to No. 4, who, after passing it round a spoke of the off wheel, returns it under the transoms of the saddle to No. 5, by whom it is passed round a spoke and again handed over the stock to No. 4. The latter then carries it down under the top felly, around the spokes, and against the nave, as with the near wheel, to the off hook of the lashing girth, and there fastens it.

For greater security, the gunner may tie the fellies of the two wheels together, behind the elevating screw, with the locking rope.

PACKING THE AMMUNITION CHESTS UPON THE MULE.

256. The instructor commands:

1. *Prepare to pack the chests.*
2. PACK THE CHESTS.

At the first command, the driver leads the mule from the rear to the distance of one yard from the chests, its head still facing them; Nos. 2 and 4 hasten to the chest on the right, and Nos. 1 and 5 to that on the left, and seize them by the handles; Nos. 1 and 2 by those in front, and Nos. 4 and 5 by those in rear.

At the second command, they raise the chests, carry them to the saddle, and attach the chains to the hooks,

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the chest inclining slightly towards the rear of the mule; Nos. 4 and 5 then secure them with the lashing straps and lashing rope.

This duty might be done with three men, by first hooking on one chest, and letting one man support it until the other is hooked on.

PACKING THE MULES AT ONE COMMAND.

257. The instructor commands:

PACK THE MULES.

At this command, the drivers lead the mules to their proper positions; Nos. 1, 2, and 3, proceed to pack the piece; and Nos. 4, 5, and the gunner, the carriage, as soon as the piece is removed. This done, Nos. 1, 2, 4, and 5, pack the ammunition chests. Each cannoneer performs his duty as directed in Nos. 254, 255, and 256.

UNPACKING THE CARRIAGE.

258. The instructor commands:

1. *Prepare to unpack the carriage.*
2. UNPACK THE CARRIAGE.

At the first command, Nos. 4 and 5 unbuckle the lashing straps, detach the lashing rope, take off the wheels, and lay them upon the ground, the large end of the nave uppermost. If the locking rope has been used, the gunner unties and detaches it. Nos. 4 and 5 then untie and remove the lashing cord, and facing to the rear, seize the arms of the axletree; the gunner facing to the front seizes the trail. All prepare to raise the carriage.

At the second command, they raise the carriage, and carry it three yards in rear of the mule; the gunner then placing the trail upon the ground, seizes the head of the carriage and holds it up; Nos. 4 and 5 removing the linch pins and washers, retain them in their hands, put on the wheels, and then replace the linch pins and washers. The gunner puts up the locking rope, and Nos. 4 and 5 the lashing rope.

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Mountain Howitzer (12 pdr) arranged for draught.

D McClelland Sc. Wash.n D.C.

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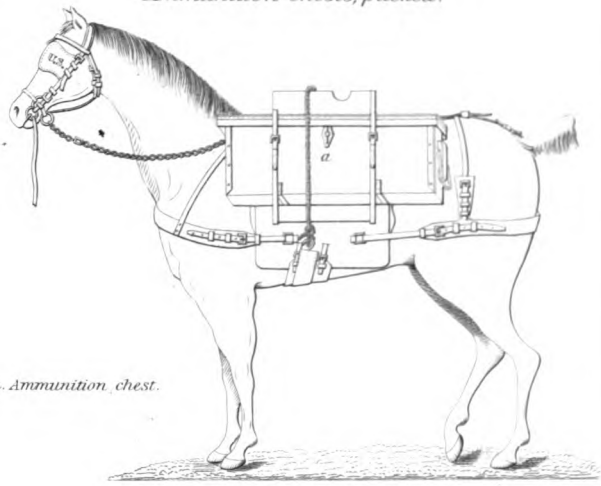
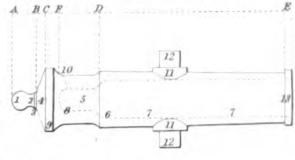
Ammunition chests, packed.



a. Ammunition chest.

Mountain Howitzer.

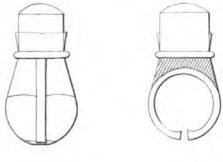


A.C. Cascable
- N.º 1 Knob.
- " 2 Neck.
- " 3 Fillet.
- " 4 Base of breech.

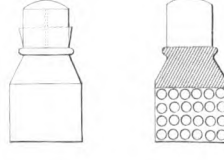
B G. Base of breech.
F D. Recess.
D E. Chase.

Bore
- N.º 5 Chamber.
- " 6 Conical surface.
- " 7 Cylinder.
- " 8 Bottom of bore.
- " 9 Base ring.
- " 10 Vent.
- " 11 Rimbases.
- " 12 Trunnions.
- " 13 Muzzle band.

Round of Spherical case.



Round of Canister.



D. M.ᶜ Clelland Sc. Wash.ⁿ D.C.

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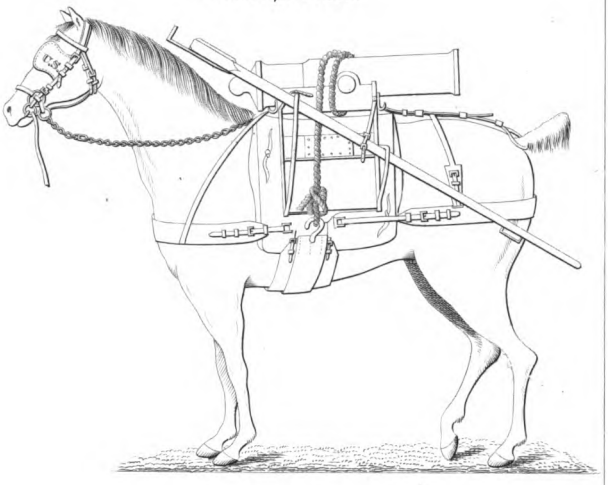
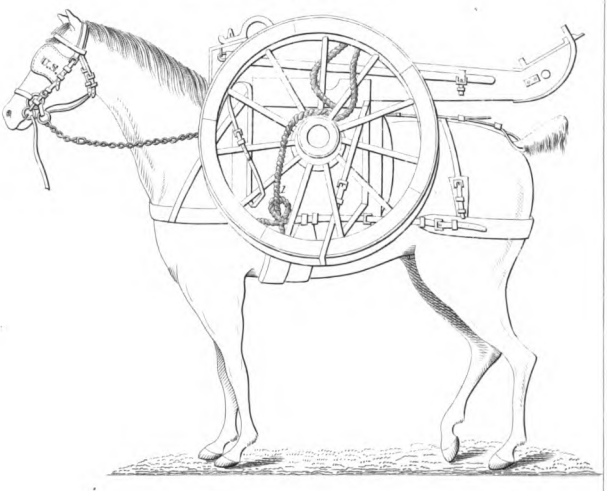
Piece packed.



Carriage packed.



N°1 Lashing girth and rope.

D.McClelland Sc. Wash.D.C.

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UNPACKING THE PIECE.

259. The instructor commands :

1. *Prepare to unpack the piece.*
2. UNPACK THE PIECE.

At the first command, the driver leads the mule in rear of and three yards from the carriage, the crupper towards the trail; Nos. 2 and 3 unbuckle the lashing straps, and, with the assistance of No. 1 acting at the ends, disengage the shafts from the saddle; No. 1 then takes hold of them near the cross bar, turns them round, and lays them on the ground, in the position prescribed No. 226. This done, Nos. 2 and 3 detach the lashing rope; and No. 1 having taken the sponge and handspike, hands the latter to No. 2, and inserts the former into the bore of the piece. No. 2 then applies his handspike as in No. 254; when, all facing towards the carriage, prepare to raise the piece.

At the second command, they raise the piece, No. 1 inclining slightly to his right to clear the wheel, and place it upon its carriage. No. 1 puts up the sponge, No. 2 the handspike, and No. 3 secures the cap squares.

UNPACKING THE AMMUNITION CHESTS.

260. The instructor commands :

1. *Prepare to unpack the chests.*
2. UNPACK THE CHESTS.

At the first command, Nos. 2 and 4 seize the handles of the right chest, and Nos. 1 and 5 those of the left; Nos. 4 and 5 having first unbuckled the lashing straps, and detached the lashing rope.

At the second command, they raise the chests, unhook them, and lay them on the ground one yard from the mule.

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UNPACKING THE MULES AT ONE COMMAND

261. The instructor commands :

UNPACK THE MULES.

At this command, the drivers place the shaft and carriage mules eight yards apart, the crupper towards the place the piece is to occupy; the gunner, and Nos. 4 and 5, proceed to unpack the carriage, and Nos. 1, 2, and 3, the piece. The sponge and handspike are not taken from the carriage until it is on the ground, nor is the piece taken from the saddle until the carriage is mounted on its wheels. Each cannoneer performs his duty as directed in Nos. 258 and 259.

If the ammunition chests are to be unpacked, it is done as soon as the piece is mounted, as prescribed in No. 260.

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SCHOOL OF THE BATTERY.

MANŒUVRES OF A BATTERY OF MOUNTAIN HOWITZERS.

Remarks. It is only when the pieces are drawn by the mules that the battery can properly manœuvre, or take part in the evolutions of troops; therefore it is to this condition of the battery only that the following manœuvres are applicable. The few movements necessary for a packed battery will be given under another head.

COMPOSITION OF THE BATTERY OF MANŒUVRE.

262. The battery of manœuvre is composed of six howitzers, (each with two ammunition chests,) and the officers and men necessary to serve them. To each piece there are three mules, viz., the shaft, carriage, and ammunition mule.

When the carriage is not likely to be packed, the carriage mule may be used for carrying ammunition.

The officers and men are as follows:

One captain, who commands the battery.

Three lieutenants, who command sections.

Seven non-commissioned officers; the senior in charge of the ammunition train, and the others in charge of pieces.

One trumpeter.

Six detachments of cannoneers, each of six men.

One driver to each mule.

263. The battery is divided into sections and half-batteries.

264. The howitzer with its carriage mule corresponds to the piece in field artillery, and the ammunition mule to the caisson. The former is directed by the chief of

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piece, and the latter by the cannoneer in charge of the ammunition chests. The howitzer, with or without the carriage mule, is denominated *piece.*

265. All the manœuvres are executed at a walk.

266. *Right and left oblique, right and left wheel, the about, the countermarch, the passage,* &c., are executed on the principles, and nearly in the manner laid down in field artillery.

267. In all formations the pieces are habitually in front. The captain, the chiefs of sections and pieces, the chief of the train, (corresponding to the chief of caissons,) and the trumpeter, occupy the same positions as in similar formations in field artillery.

The alignment is made on the drivers, except in battery, when it is made on the wheels.

HITCHING AND UNHITCHING.

268. As prescribed in the school of the piece, No. 248, and following.

POSTS OF THE CANNONEERS AND DRIVERS.

269. During the manœuvres, the cannoneers and drivers are at their posts about the piece and ammunition chests, as in No. 221, and following.

ORDER IN COLUMN.

COLUMN BY PIECE.

270. The pieces are arranged in single file; each howitzer followed by its carriage mule, and the latter by the ammunition mule, the distance between each being two yards.

COLUMN BY SECTION.

271. The pieces are arranged in two files; each howitzer followed by its carriage and ammunition mules; the order and distance the same as in column by piece.

The interval between the files is seven yards.

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ORDER IN LINE.

272. The pieces are arranged in line, each howitzer followed by its carriage and ammunition mules in the order and at the distance observed in column.

The interval between the pieces is seven yards.

ORDER IN BATTERY.

273. The pieces are arranged in line, and prepared for firing. The mules are formed in three lines parallel to the first. See No. 217.

The interval between the pieces is seven yards.

DISPOSITION OF THE BATTERY IN PARK.

274. In park, the howitzers, with the shafts attached, are arranged in line.

The ammunition chests of each howitzer are placed on the ground eight yards in rear of the pieces, their sides parallel to the axis of the piece, backs touching, the turn-buckles out side.

275. *Spaces occupied by the piece and battery in the different formations.*

	Depth yards.	Front yards.
Howitzer drawn by its mule	4½	1
Howitzer with shafts	4	1
Howitzer without shafts	2	1
Carriage, or ammunition mule	2½	1
Column by piece	91	1
Column by section	45	10
Order in line	14	41
Order in battery	30	41
Section in line	14	10
Section in battery	30	10

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MANNING THE BATTERY.

276. The detachments of cannoneers are formed in line, and in the order of the pieces to which they belong.

The mules, with their drivers, are also formed in line; the shaft, carriage, and ammunition mules of the first howitzer on the right, in the order named; the mules of the second on their left, in like order, and so on.

The cannoneers are marched to the battery, and to their posts, as in field artillery, No. 11, and following.

The mules are conducted to the battery in single file. On reaching the battery, the shaft mules moving to the front, are led to their pieces and hitched in; the carriage mules advancing between the pieces and chests are halted at their places, two yards in rear of the pieces; and the ammunition mules moving to the rear, are halted one yard from the chests in the position prescribed for packing them.

The gunner and No. 3 assist in hitching in. Whilst this is doing, the other cannoneers pack the chests, and the guuner attaches the locking rope to the saddle of the shaft mule.

TO UNPARK.

277. Every thing being prepared for manœuvring, the captain unparks the battery in column by piece, as prescribed in field artillery, No. 136.

TO HALT.

TO FORM SECTIONS.

TO PLACE THE MULES ON THE FLANKS.

TO MARCH IN COLUMN.

TO HALT THE COLUMN.

TO MARCH BY A FLANK.

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THE OBLIQUE MARCH.

THE PASSAGE.

THE ABOUT IN COLUMN.

THE COUNTERMARCH IN COLUMN.

THE CHANGES OF DIRECTION.

TO BREAK SECTIONS.

TO PLACE THE MULES IN REAR FROM THE FLANKS.

278. All these manœuvres, with the exception of the march by a flank, are executed like the corresponding manœuvres in field artillery, (Nos. 138, 140, 141, 142, 143, 145, 146, 147, 148, 149, 150, 151, 152,) with such modifications as the difference in the composition of the two batteries require.

279. *To execute the march by a flank*, the carriage mules at the word MARCH, wheel at once to the right, (or left,) and march abreast, between the shaft and ammunition mules.

TO FORM THE PARK.

280. The battery being in column of pieces, and near the ground on which it is to be parked, the captain forms the park in the manner prescribed in field artillery, No. 153.

The cannoneers enter the park with the pieces, and assist in unhitching the mules and unpacking the chests.

The detachments and mules are marched from the park according to the principles prescribed in the schools of the piece and driver in field artillery.

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TO PASS FROM THE ORDER IN COLUMN TO THE ORDER IN LINE, AND THE REVERSE.

FORWARD INTO LINE.

TO FORM LINE FACED TO THE REAR.

281. These manœuvres are executed as prescribed in field artillery, Nos. 154 and 155. The leading section halts after advancing ten yards.

TO FORM LINE TO THE RIGHT OR LEFT.

TO FORM LINE ON THE RIGHT OR LEFT.

TO BREAK INTO COLUMN TO THE FRONT.

TO BREAK INTO COLUMN TO THE REAR.

282. Executed as in field artillery, Nos. 156, 157, 158, and 159. In the last two manœuvres, the chiefs of the sections which oblique, give the command MARCH, each at the moment the ammunition mules of the preceding section arrive opposite to him.

TO BREAK INTO COLUMN TO THE RIGHT OR LEFT.

283. Executed as in field artillery, No. 160.

TO BREAK INTO COLUMN TO THE FRONT (OR REAR) FROM ONE FLANK, TO MARCH TOWARDS THE OTHER.

284. Executed as in field artillery, Nos. 161 and 162. The chiefs of the two rear sections give the command MARCH, each at the moment the carriage mules of the section which precedes him in column arrives opposite to him.

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TO BREAK INTO COLUMN TO THE FRONT, WHEN THE BATTERY IS MARCHING IN LINE.

285. Executed as in field artillery No. 163, with the modifications indicated in No. 282.

MARCH IN LINE.

The manœuvres under this head are :

TO ADVANCE IN LINE.

TO HALT THE BATTERY AND ALIGN IT.

TO MARCH BY A FLANK.

THE OBLIQUE MARCH.

THE PASSAGE.

THE ABOUT.

THE COUNTERMARCH.

THE CHANGES OF DIRECTION.

THE PASSAGE OF OBSTACLES.

286. All these manœuvres are, with the exception of the march by a flank, executed like the corresponding ones in field artillery Nos. 169, 170, 172, 173, 174, 175, 176, 177, and 182. For the march by a flank, see No. 279.

FORMATIONS IN BATTERY.

IN LINE, TO FORM IN BATTERY TO THE FRONT.

287. The captain halts the battery, if not already at a halt, and commands :

ACTION FRONT.

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At this command, the shaft mules are unhitched; the pieces brought about; the shafts detached; and the mules led to their places as prescribed in No. 252.

IN LINE, TO FORM IN BATTERY TO THE REAR.

288. The captain halts the battery, if not already at a halt, and commands :

ACTION REAR.

At this command, the pieces are put in battery, and the mules led to their places as prescribed in No. 253.

IN BATTERY, TO FORM IN LINE TO THE FRONT.

289. The captain commands :

HITCH TO THE FRONT.

At this command, the shaft mules are hitched in to the front, and the carriage and ammunition mules led up to their places as prescribed in No. 248.

IN BATTERY, TO FORM IN LINE TO THE REAR.

290. The captain commands :

HITCH TO THE REAR.

At this command, the shaft mules are hitched in, and the other mules led to their places in rear, as prescribed in No. 250.

TO PASS FROM THE ORDER IN COLUMN TO THE ORDER IN BATTERY.

291. The battery being in column—in march, or at a halt—to form it *into battery—to the front—faced to the rear—to the right or left*, or *on the right or left*—the captain deploys it as directed for the formations in line, Nos. 281 and 282. As soon as the sections arrive in line, they are formed into battery to the front, or rear, as prescribed in Nos. 287 and 288.

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TO PASS FROM THE ORDER IN BATTERY TO THE ORDER IN COLUMN.

292. The captain first forms the battery in line to the front, or rear, as prescribed in Nos. 289 and 290, and then breaks into column.

TO MARCH BY A FLANK FROM THE ORDER IN BATTERY.

293. Being in battery to gain ground immediately by one of the flanks, the captain causes the shafts to be attached, and then commands :

1. *Pieces left (or right,) mules right (or left) wheel.*
2. MARCH.

At the first command, the cannoneers hook on their bricoles, and seize the shafts as directed in No. 243. At the second, the pieces are turned in the direction indicated, and urged forward by means of the cannoneers; and the mules, each wheeling on its own ground, are led forward in the same direction.

294. *To reform the battery*, the captain commands :

1. *Battery.*
2. HALT.
3. ACTION RIGHT (OR LEFT.)

These commands are executed as already prescribed.

295. If the battery were required to move for some distance by a flank, the captain might command :

HITCH TO THE RIGHT (OR LEFT.)

And this being executed as prescribed in No. 249, march the battery in the required direction by an ordinary flank movement.

FIRINGS.

296. The firings are executed according to the principles laid down in field artillery; but when movements are necessary for short distances during the firing, the abouts are executed by hand, and the pieces are drawn by means of the cannoneers.

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When the captain wishes to use the locking rope, he gives the necessary order.

Each chief of piece directs the cannoneer, whose duty it is to attach the locking rope, to bring it from the shaft mule. On quitting the order in battery, the locking rope is replaced on the saddle of this mule.

TO FIRE ADVANCING.

TO FIRE RETIRING.

297. Executed on the principles laid down in field artillery Nos. 204 and 205; the pieces being drawn by the cannoneers.

MOVEMENTS IN ECHELON.

298. Executed on the principles prescribed in field artillery No. 206; the shaft mule next to the one commencing the movement, (or shafts if the pieces be drawn by the cannoneers,) being in line with the ammunition mule of this leading piece, and so on with the others.

MOVEMENTS OF A PACKED BATTERY.

These movements are limited *to unparking; to forming column and line*; and *to forming the park.*

TO UNPARK.

299. The detachments and mules are formed and marched to the park as in manning the battery, No. 276.

On arriving at the park, the cannoneers are ordered to their posts, and the command given—PACK THE MULES. At this command, the mules are led to their proper positions, and packed as in No. 257. This done, the captain causes the battery to unpark in column by piece.

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COLUMN BY PIECE.

300. All the mules are in single file; the shaft mule followed by the carriage mule, and the latter by the ammunition mule; the distance between each being two yards.

COLUMN BY SECTION.

301. The mules are arranged in two files, with an interval of seven yards between them; the order and distance in each file being the same as in column by piece.

IN LINE.

302. The shaft mules are arranged in one line; each mule followed by its carriage and ammunition mule in the order, and at the distance, prescribed for the column by piece or section. The interval between the mules is seven yards.

Remark. Passing from the order in column to the order in line, and reciprocally, is executed as in the manœuvres of the battery when the pieces are drawn by mules.

TO FORM THE PARK.

303. The captain makes the dispositions prescribed in No. 280.

The drivers on entering the park, arrange their mules as for unpacking, and the cannoneers enter the park with the mules in order to unpack them.

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REVIEWS.

PARADE FOR REVIEW AND INSPECTION.

304. The battery being in line, is prepared for review and inspection by the command, and on the principles laid down in field artillery, No. 214.

The carriage and ammunition mules reversing to the left at the word MARCH, gain ground to the rear, and form, by reversing to the left again, two lines parallel to the pieces; the carriage mules being six yards from the detachments, and the ammunition mules six yards from the carriage mules. The detachments are six yards from the pieces, as in field artillery.

If the battery be packed, the cannoneers remain at their posts about the mules, which are formed in three lines in the usual order; the distance between the lines being six yards.

PASSING IN REVIEW.

The battery passes in review either in column of pieces or sections. The cannoneers are at their posts as in No. 223.

If the battery be packed, it passes in review in the same manner.

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305. *Implements and equipments required for each carriage.*

1 Handspike,
1 Sponge and rammer, } On the carriage.
1 Sponge cover, on the sponge.
1 Vent cover, on the piece.
2 Haversacks,
1 Tube pouch,
1 Fuze pouch, } On the pack, with the ammunition chests.
1 Small tarpaulin,
1 Priming wire, in the tube pouch.
1 Knee piece,
1 Gunner's gimlet, } In the fuze pouch.
2 Lanyards for friction tubes,
1 Gunner's pincers,
1 Fuze plug reamer, } In tool chest A.
2 Bricoles.

Chests for the Forge and Smith's Tools.

306. The forge and smith's tools are packed in two chests, which are alike, except in the interior divisions. The forge chest has socket plates for the legs of the forge to stand on.

Carriage maker's Tools and Stores.

The tools and stores for the use of carriage-makers, in repairing the carriages and equipments, are packed in two chests, which are like those for the ammunition, but without the interior divisions.

The hasp, and hasp staples, are like those for the forge chest.

The two chests are designated by the letters A and B.

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307. *Dimensions of the carriage and equipments.*

	Inches.
Height of axis of trunnions above the ground	27.
Vertical plane of fire, above the horizontal line	9°
Vertical plane of fire, below the horizontal line	7°
Distance between the points of contact of the wheels and trail with the ground line	43.7
Distance from front of wheels to end of trail, the piece being in battery	71.8
Distance of the muzzle of the piece, in battery, in rear of the wheels	2.44
Length of the gun carriage, without wheels	61.
Length of shafts	73.
Whole length of the axletree	38.25
Track of the wheels	30.2
Height of the wheel	38.
Disk of finished wheels	2.
Ammunition chest, or carriage maker's tool chest, interior length	32.8
Ammunition chest, or carriage maker's tool chest, interior width	4.75
Ammunition chest, or carriage maker's tool chest, interior depth	9.35
Smith's tool chest, interior length	32.8
Smith's tool chest, interior width	8.
Smith's tool chest, interior depth	16.25

308. *Weight of howitzer, carriage, and equipments.*

Howitzer	220 lbs.
Carriage, without wheels	157 "
One wheel	65 "
Handspike	5 "
Sponge and rammer	3 "
Carriage complete, with equipments	295 "
Shafts	30 "
Bridle	3 "
Halter	3.5 "
Pack saddle and harness	44 "
Lashing girth and rope	3 "
Ammunition chest, or carriage maker's tool chest, empty	20 "
Forge chest, or smith's tool chest, empty	42 "
Ammunition chest, packed	112 "
Forge chest, packed	115 "
Smith's tool chest, packed	117 "
Coal sack, filled with charcoal	25 "
Carriage maker's tool chest A	45 "
Carriage maker's tool chest B	45 "

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AMMUNITION.

309. The ammunition for the mountain howitzer consists of *shells*, *spherical case shot*, and *canister*; to all of which the cartridge is fixed by means of a *sabot*.

The charge of powder is uniformly eight ounces.

The cartridge bag is made of woollen stuff.

SHELLS, AND SPHERICAL CASE SHOT.

The shells, and spherical case shot are the same as for other pieces of the same calibre.

The fuzes are like those for field service, viz., the composition is contained in a paper case, which at the moment of firing, is inserted into a wooden plug previously driven into the fuze hole.

These fuzes being all of the same length, the time of burning is regulated by the proportions used in making the fuze composition. The two second fuzes are colored *black*, the three second *red*, and the four second *green*.

After the shell, or spherical case shot has been strapped to the sabot, it is charged with powder, the fuze plug is driven in, and the hole for the paper fuze reamed out. This hole is then stopped with a plug of tow, pressed in hard; the wooden plug should project about 0.1 of an inch from the fuze hole.

Charge of shell seven ounces rifle powder.

Charge of spherical case shot four and one-half ounces rifle powder, and seventy-eight musket bullets.

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CANISTERS.

310. The canister for the mountain howitzer is filled with musket bullets; its dimensions and weight are as follows:

Number of bullets in each tier -	37
Number of tiers of bullets - -	4
Whole number of bullets - -	148
Height of finished canister, including sabot - - - - -	6.85 inches
Weight of finished canister, including sabot - - - - -	11.2 lbs.

FIXED AMMUNITION.

311. *Dimensions and weights of fixed ammunition.*

	Shell.	Spherical case shot.	Canisters.
	in.	in.	in.
Height of shell strapped, or canister with sabot - - - - -	5.92	5.92	6.85
Height of round of fixed ammunition -	8.17	8.17	9.1
	lbs.	lbs.	lbs.
Weight of projectile, strapped and loaded	9.2	11	11.2
Weight of round of fixed ammunition -	9.8	11.6	11.8

CONTENTS OF EACH AMMUNITION CHEST.

312. The chest contains eight rounds of fixed ammunition, viz., two shells, five spherical case shot, and one canister.

Four of the spherical case shot are placed in the bottom tier, with the bullets down; the remaining spherical case shot, the shells, and the canister in the upper tier, with the cartridges down; the canister in the right hand end of the chest.

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In each chest are placed :

4 two-second fuzes, (black.)
7 three-second fuzes, (red.)
3 four-second fuzes (green.)
10 friction primers.

The fuzes and primers are wrapped in water proof paper, and the whole load well packed in tow.

A supply of friction primers, equal to half the number of rounds of ammunition belonging to the battery, should be carried in reserve.

WEIGHT OF PACKS.

	Weight.
313. The howitzer and the shafts of the carriage - - - - - - - -	250 lbs.
The carriage, with wheels and implements	295 "
Two ammunition chests, with the haversack, tube pouch, and fuze pouch, covered with the tarpaulin - - - - - -	238 "
Two forge chests - - - - - -	232 "
Two chests for carriage maker's tools (90 lbs.) with the coal sack (25 lbs.) - -	115 "
Saddle and harness, complete - - -	53 "

The same kind of pack saddle serves for each of these packs.

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RANGES.

314. *Ranges of Mountain howitzer.*

Charge.	Ball.	Elevation.	Range.	Remarks.
Pounds.	——	Degrees.	Yards.	
0.5	shell	0	170	
"	"	1	300	
"	"	2	392	
"	"	2 30′	500	Time, two seconds.
"	"	3	637	
"	"	4	785	Time, three seconds.
"	"	5	1005	
"	s. c. s.	0	150	
"	"	2 30′	450	Time, two seconds.
"	"	3	500	
"	"	4	700	Time, 2.7 seconds.
"	"	4 30′	800	Time, three seconds.
"	can'ter	4 to 5°	250	

315. *Table of Tangent scales for* 12 *pdr. Mountain howitzer.*

	Inches.	
Radius of base ring,	3.8	Point of suspension of the hausse 1 in. in rear of the base ring. Distance to sight (radius) 33.91.
Dispart - - -	0.35	
Tangent, 1° -	0.59	By dividing the space between the degrees, half and quarter degrees may be obtained.
2° -	1.18	
3° -	1.77	
4° -	2.36	
5° -	2.95	
6° -	3.55	
7° -	4.15	

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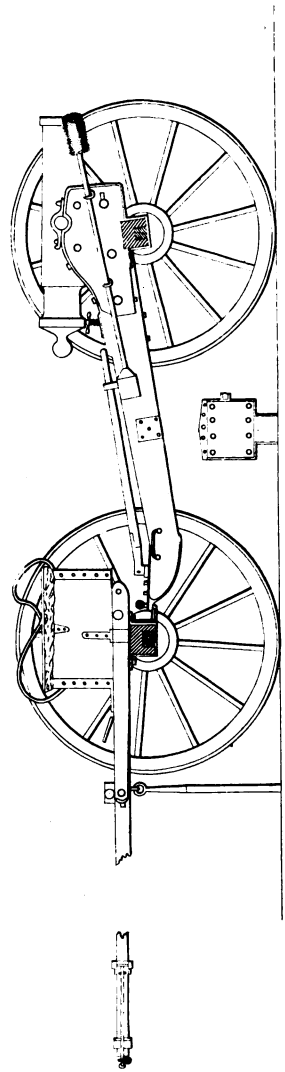
Mountain Howitzer on a Prairie Carriage.



Lt. R. H. Rush, 2d Art. Delt. D. McClelland Sc. Wash.n D. C.

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INSTRUCTION FOR THE MOUNTAIN HOWITZER MOUNTED ON A PRAIRIE CARRIAGE.

316. The mountain howitzer carriage, which is arranged for packing, being ill adapted for draught, a wider carriage, similar to that for a field piece, has been adopted for service in a prairie country, and called the *Prairie Carriage.* (Plate 73.)

The limber has two ammunition boxes, each carrying eight rounds. Two small boxes are placed on the axletree, one on each side of the cheeks, for carrying one or more rounds of canister, and the small implements or stores required for the service of the piece.

The handspike is attached by a hinge to the trail, and when not in use, is turned over on the stock, and secured in its place by a strap.

Two sponges and rammers are carried on the carriage, one attached to each cheek; the equipments and the ammunition are the same as prescribed for the howitzer on the mountain carriage.

SERVICE OF THE PIECE.

317. Seven men, including the gunner, are required for the service of the piece. They are told off and posted as in field artillery, except that, when in battery, Nos. 1 and 2 are about one yard outside of the wheels, and opposite to the ends of the axletree. With this number of men, the piece is served as in field artillery; but with a less number, it is served as prescribed for the mountain howitzer, with the exception that Nos. 1 and 2, with the modification above indicated, continue to serve it as prescribed in field artillery.

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COMPOSITION OF THE BATTERY.

318. The composition of the battery of manœuvre is similar to that of the field artillery, except that there are no caissons, and but two horses or mules to each piece; the extra ammunition being carried on packs, or in carts or wagons.

MANŒUVRES OF THE BATTERY.

319. Such manœuvres as the battery may be required to perform, are executed by the same commands, and in a similar manner to those prescribed for field artillery for manœuvring without caissons. The intervals between the pieces should be ten yards, attention being given to the rule laid down in No. 130.

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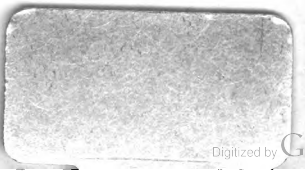
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